THE DOGS OF THE DOW STRATEGY APPLIED TO THE S&P 500

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Abstract

The Dogs of the Dow trading strategy popular strategy that invests in the ten stocks with the highest dividend yield in the Dow Jones Industrial Average. We examine a newer variation of this strategy that involves investing in the five highest dividend yield stocks from each sector of the S&P 500. We compare returns of this this strategy to those of the Dogs of the Dow and to those of the S&P 500. We find that this strategy has higher raw returns than both the Dogs of the Dow and S&P.

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I. Overview

The Dogs of the Dow is a value investing strategy that selects 10 stocks from the Dow Jones Industrial Average (DJIA) based on their dividend yields. This strategy, also known as the Dow 10 or Dow Dividend strategy, became popular in the late 1980s and has been consistently popular since then (McQueen and Thorley, 1999). It has been highlighted in a number of books and a number of mutual funds have been established that implement variations of this strategy such as Merrill Lynch's Select 10 Portfolio (McQueen, Shields, and Thorley, 1997). Specifically, the Dogs of the Dow strategy involves selecting the 10 DJIA components with the highest dividend yields each January. The stocks selected are held for one year, at which time the process is repeated and the portfolio is rebalanced (McQueen and Thorley, 1999).

A number of academic studies have examined this strategy, producing mixed results. For example, McQueen, Shields, and Thorley (1997) find that although the strategy's returns beat those of the Dow with statistical significance, these results become questionable after adjusting for risk, transaction costs, and taxes. These factors negatively impacted the strategy's performance. Similarly, Hirschey (2000) notes the strategy has both periods of over performance and underperformance and finds no abnormal returns after adjusting for taxes and transaction costs. Both McQueen and Thorley (1999) and Hirschey (2000) note varying performance of the Dogs of the Dow over different time periods. More recently, Filbeck, Holzhauer, and Zhao examine a variation of the Dogs of the Dow using Fortune's Most Admired Companies (MAC) and found that the strategy beat the S&P in most years, even on a risk adjusted basis.

In this study, we examine the performance of another recent variation of the Dogs of the Dow Strategy, the S&P Sector Dividend Dogs strategy. This variation, implemented by ALPS through its Sector Dividend Dogs ETF applies the Dogs of the Dow strategy to the S&P 500,

selecting the 5 highest dividend yielding companies from each of the 11 sectors in the S&P 500 (ALPS Portfolio Distributor, 2018). This variation may improve upon the original Dogs of the Dow strategy in two ways. First, it provides a larger pool of companies to draw from (500 rather than 30), and second, it provides improved diversification by holding a greater number of securities and ensuring these are spread across all sectors of the economy. This increased diversification is of particular interest, as this may improve upon the risk-adjusted performance of the traditional Dogs of the Dow Strategy.

Since its establishment in 2012, the ALPS Sector Dividend Dogs ETF has performed well (Arancibia, 2016). However, its short history, predominantly in a bull market, make it hard to draw conclusions about effectiveness of this strategy. Our study will provide insight into this, by examining the Sector Dividend Dogs strategy over a longer time period. We will examine its return performance relative to the market as whole and the Dogs of the Dow both in terms of raw returns and on a risk-adjusted basis. The rest of this thesis is organized as follows: Section II provides a review of related literature, Section III addresses our data and methodology, Section IV presents our results, and Section V contains our discussion and conclusion.

II. Literature Review

The Dogs of the Dow is a value strategy, which is one that seeks to provide abnormal returns by investing in undervalued securities. Securities can become undervalued when overly pessimistic investors stop investing in reputable securities because of an unexpected or unsettling event. This event causes investor confidence to weaken in that company (Hirschey, 2000). For example, if earnings do not meet analyst expectations for the quarter, investors may stop investing and cause the price to fall below the intrinsic value of the company. Value strategies

tend to perform well compared to common benchmarks (Hirschey, 2000). Over time, the stock price should rise when the firm regains favor with investors. This readjustment of reputable securities in value strategies is the cause of their higher performance levels (Hirschey, 2000).

Many studies have been conducted to examine the effectiveness of the Dogs of the Dow strategy yielding mixed results. Early studies beginning in the late 1980's found that the Dogs of the Dow had higher returns than the Dow Jones Industrial Average (Domain, Louton, and Mossman). See for instance Slatter (1988), Knowles and Petty (1991), and O'higgins and Downes (1992).

McQueen, Shields, and Thorley (1997) examined the performance of the Dogs of the Dow in comparison to the Dow Jones Industrial Average over a sample period from 1946 to 1995. They found that the Dogs of the Dow outperformed the Dow Jones Industrial Average in the 1970's and 1980's after adjusting for risk. However, they also found that after the returns of the Dogs of the Dow had been adjusted for risk, transaction costs, and taxes, the strategy's performance matched that of the Dow Jones Industrial Average. Hirschey (2000) also compared the performance of the Dogs of the Dow to the Dow Jones Industrial Average and found similar results. From years 1961 to 1998, the Dogs of the Dow outperformed the market. However, after adjusting for taxes and transactions costs, the Dogs of the Dow simply matched the performance of the Dow Jones Industrial Average.

In a study conducted by Domain, Louton, and Mossman (1998), they built a high yield portfolio (the Dogs of the Dow) and a low yield portfolio from the Dow Jones Industrial Average and compared them to the S&P 500 and the Dow Jones Industrial Average. They find that from 1964 to 1997, the Dogs of the Dow did not outperform the Dow Jones Industrial Average once

adjusted for risk, transactions costs, and taxes. Domain, Louton, and Mossman (1998) also find, however, that the Dogs of the Dow outperforms the low yield portfolio and the S&P 500.

Variations of the Strategy

Variations of the Dogs of the Dow have also been examined. McQueen and Thorley (1999) examine three existing variations that promise higher returns. The first strategy they look at is the Dow Five strategy, which involves picking 5 of the lowest priced stocks from the Dogs of the Dow. Another investing strategy that McQueen and Thorley (1999) cover was the Dow Four strategy, which drops the lowest priced stock from the Dow Five. Finally, they looked at the Foolish Four investing strategy, which begins as the Dow Four strategy but then doubles up on the second lowest priced stock. McQueen and Thorley (1999) looked at how each of these Dogs of the Dow variations performed compared to the Dow Jones Industrial Average. From 1973 to 1996, the Dogs of the Dow strategy had a 20% annual return, the Dow Five had a 23% annual return, the Dow Four had a 26% annual return, and the Foolish Four had a 28% return. As the variations get more complex, the returns of each variation gets higher. McQueen and Thorley (1999) go on to note that higher returns are the result of data mining through adding screens. To illustrate this, they create the "Fractured Four" portfolio, which implements the Dow Four strategy in even years and the Foolish Four strategy in odd years. Their mined "Fractured Four" portfolio yielded a 34% return that was even higher than the other variations. In warning against data mining they note, "A valid trading strategy must have a plausible theory or story as to why the strategy works. For example, the Foolish Four's great-grandfather, the Dow Dividend portfolio, can be justified as an application of value style investing" (McQueen and Thorley, 1999).

Rather than focusing on data mining, some variations are based on theory. In a more recent study, Filbeck, Holzhauer, and Zhao (2017) applied the Dogs of the Dow strategy to Fortune's list of Most Admired Companies (MAC). They created a portfolio containing the MAC stocks with the highest (top 10%) dividend yields each year in their sample period (2000 to 2012). They hypothesized that the MAC would outperform the Dogs of the Dow because of the differences in reputation of the firms in the two strategies and the increased diversification of MAC stocks. After adjusting for risk and transaction costs, the MAC Dogs outperformed the Dogs of the Dow. Filbeck, Holzhauer, and Zhao (2017) attribute this is due to the MAC Dogs' strong reputation and diverse selection of stocks.

International Evidence

The Dogs of the Dow strategy has been examined on a global scale. For instance, one study applied the Dogs of the Dow strategy in the Latin American markets of Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela showed that when the Dogs of the Dow strategy was applied to their markets, it beat the market in all countries with the exception of Brazil (Da Silva, 2001). Filbeck and Visscher (1997) applied the Dogs of the Dow strategy to the British stock market. They found that the strategy usually underperformed in the market and only outperformed the British stock market in some years (Filbeck and Visscher, 1997). In a study of Canadian stocks, Filbeck and Visscher (2003) applied the Dogs of the Dow strategy to the Toronto 35 Index. They found that the Dogs of the Dow strategy beat the market even after accounting for transactions costs, taxes, and risk. Another study applied the Dogs of the Dow strategy in China from 1994 to 2009. It showed that the strategy also yielded high returns compared to the Chinese stock market (Wang, Larsen, et. al, 2011). Rinne and Vahamaa (2011) find the same positive results using the Finnish stock market. When applied to the Euro Stoxx

50, the Dogs of the Dow strategy has beaten the market 65% of the time over the past 20 years. It also beat the market on a risk adjusted basis (Farran and Shahruz, 2013). Pandey (2017) looked at the Dogs of the Dow strategy on the Indian Sensex. He found that the Dogs of the Dow strategy beat the market on a risk adjusted basis as well (Pandey, 2017). Thus while the international evidence is mixed, overall, it seems to favor the Dogs of the Dow strategy.

Our Study

In this study, we add to the literature by analyzing the effectiveness of another Dogs of the Dow variation, the S&P Sector Dividend Dogs strategy. Like the MAC Dogs, this strategy will provide more diversification. This strategy is particularly interesting given that its broader diversification may improve upon the risk adjusted performance of the traditional Dogs of the Dow strategy. We compare the returns of the Sector Dividend Dogs strategy to those of the S&P 500 and the traditional Dogs of the Dow strategy. After this, we take risk into account by examining the strategy's Sharpe Ratio and Treynor Measure relative to those of the traditional Dogs of the Dow and the S&P 500. In addition, we examine Jensen's Alpha and the alpha from the Fama French 3-Factor Model.

III. Data Sample and Research Methodology

Sample Selection and Descriptive Statistics

In this study, we compare the annual returns of the Sector Dogs investment strategy to the annual returns of the S&P 500 and the traditional Dogs of the Dow strategy. We conduct comparisons of these indexes and investment strategies over an 18 year period (from 2000 to 2017) in order to help fully analyze the data over an extended period of time in multiple market environments.

We obtained firm level accounting data for the S&P 500 and the Dow Jones Industrial Average constituents from the Standard and Poor's COMPUSTAT database. Using this data, we computed year-end dividend yields to select sample firms for the following year. Year-end dividend yields were calculated for each firm by annualizing the 4th calendar quarter dividend and dividing it by the year end stock price. To find the Sector Dogs, the dividend yields of each company in the S&P 500 were arranged in descending order by sector and by year. The top 5 companies with the highest dividend yields from each sector were identified and made part of the Sector Dogs Portfolio. To find the Dogs of the Dow, the dividend yields of each company in the DIJA were arranged in descending order by year. The top 10 companies with the highest dividend yields from each year were identified and made part of the Dogs of the Dow Portfolio.

After selecting our sample firms, we computed a number of financial ratios and compiled other descriptive statistics to determine if there were differences among the two samples and the firms of the S&P 500. The financial ratios examined include: Debt to Assets, LTD Debt to Assets, Debt to Capital, Debt to Equity, Interest Coverage, ROS, ROA, ROE, ROIC, PE, and Market/Book ratios. See **Appendix A** for ratio definitions. The size variables, Market Capitalization and Total Assets are also included.

Tables 1A, 1B, and **1C** in **Appendix B** contain the descriptive statistics for these variables. These tables display the average values for each variable and differences in each variable among the S&P 500 constituents, the companies of the Sector Dogs sample, and the companies of the Dogs of the Dow sample. The variables are categorized by size, leverage, profitability, and value, and we conduct standard t-tests to determine whether or not the differences are statistically significant.

In regards to size, these tables show that the Sector Dogs sample firms, on average, have a larger market cap than the S&P 500 companies. The Dogs of the Dow Portfolio sample firms have an average market cap larger than both the S&P 500 companies and the Sector Dogs sample firms, and this difference is significant at the 1% level. Hence, larger companies comprise most of the Dogs of the Dow and Sector Dogs sample, with the largest company average being in the Dogs of the Dow sample. Since the Dow Jones Industrial Average is an index comprised of large companies, this result is to be expected. The Sector Dogs sample firms also tend to have higher total assets than the S&P 500 companies. Again though, the Dogs of the Dow sample firms tend to have the highest average total assets among both the Sector Dogs sample firms and the S&P 500 companies, and this is significant to the 1% level as well. This would make sense being that the companies in the Sector Dogs and the Dogs of the Dow sample firms have higher dividend yields, which indicates more mature companies.

Under leverage ratios, these tables show that both the Sector Dogs and the Dogs of the Dow Portfolio sample firms have higher debt ratios than those companies of the S&P 500 in almost all categories, which means that the companies of the Sector Dogs and the Dogs of the Dow sample firms used more leverage. The Sector Dogs sample firms tend to have higher debt than the Dogs of the Dow sample firms, which is seen in the higher long-term debt to asset ratio and the higher debt to capital ratio. All of the differences in debt are statistically significant at conventional levels.

The Dogs of the Dow sample firms tend to be more profitable than both the S&P 500 companies and the Sector Dogs sample firms as seen in the profitability ratios. In fact, the Sector Dogs sample firms have lower returns on assets and equity than the S&P 500, and this difference is statistically significant to the 1% level. Overall, this means that the highest returns on

investments in the company are occurring in the Dogs of the Dow Portfolio companies and the lowest returns on investments in the company are occurring in Sector Dogs Portfolio companies. While the differences in return on assets and return on equity are significant, return on invested capital is not statistically significant, which suggests that overall they are generating approximately the same returns after adjusting for capital structure. However this result is questionable we data limitations force us to use a modified ROIC[1].

As expected, the tables show that both the Dogs of the Dow sample firms and the Sector Dogs sample firms had higher dividend yields than the S&P 500, which is to be expected as they are selected to be in each portfolio based on dividend yield. The Sector Dogs portfolio companies have higher dividend yields than the Dogs of the Dow sample firms as well, and this observation has a 1% statistical significance. When compared to the Dogs of the Dow sample firms, the Sector Dogs sample firms had the higher market to book value, with the observation being statistically significant. The Dogs of the Dow sample firms actually had the lowest market to book value when compared to both the Sector Dogs sample firms and the S&P 500. Given that these are value strategies, we would expect our sample firms to have lower price-earnings ratios and lower market to book ratios. The Sector Dogs sample firms do have a lower price-earnings ratio and a marginally lower market to book ratio than the S&P 500 companies, but these results are statistically significant. However, the Dogs of the Dow sample firms have lower price-earnings ratios and market to book ratios than the S&P 500, and these are both statistically significant to the 1% level. The Dogs of the Dow sample firms have the lowest price-earnings

[1] ROIC is generally calculated as EBIT(1-t)/Total Capital. This formulation controls for differences in capital structure by dividing after tax operating income by all capital (Interest Bearing Debt plus Equity). Due to data limitations, we calculate ROIC as NI/Total Capital. Thus, our numerator, NI (that included interest expense), is impacted by capital structure while our denominator is not.

ratios and market to book ratios. Though these are not statistically significant, they indicate that the Dogs of the Dow sample firms have more of a value tilt than the Sector Dogs sample firms.

Return and Risk-Adjusted Return Measures

After creating the Sector Dogs and the Dogs of the Dow for each year, we obtained the return data from the University of Chicago's CRSP database and calculated the returns to each portfolio assuming equal weighting of the constituents. We then compare the monthly return and the annual buy and hold returns of the Sector Dogs Portfolio to those of the Dogs of the Dow Portfolio and the S&P 500.

Given the significant differences in firm characteristics among the sub-samples and the S&P 500 (shown in **Tables 1A**, **1B**, and **1C)**, could indicate differing levels of risk, we also look at several risk-adjusted performance measures. These measures include the Sharpe Ratio, Treynor Ratio, Jensen's Alpha, and the alpha from a Fama French 3-Factor Model.

Our first measure of risk-adjusted returns is the Sharpe Ratio. The Sharpe Ratio measures the excess return per unit of total risk as measured by the standard deviation (Sharpe, 1966). We calculate the Sharpe Ratio by dividing the excess return on each portfolio by the standard deviation where the excess return is the difference between the average monthly return and the risk free rate as shown in **Equation 1.**

Equation 1: $$S = \frac{R_{pt} - R_f}{\sigma_{pt}}$$

Our second measure of risk-adjusted returns is the Treynor Ratio. The Treynor Ratio measures the excess return per unit of systematic risk of the portfolio as measured by beta (Treynor, 1965). We calculate the Treynor Ratio by dividing the excess return on each portfolio

by the beta where the excess return is the difference between the average monthly return and the risk free rate as shown in **Equation 2**.

Equation 2: $$T = \frac{R_{pt} - R_f}{\beta_{pt}}$$

The third measure of risk-adjusted returns is Jensen's Alpha. Jensen's Alpha measures the portfolio's excess return above what is predicted by the single factor CAPM (Jensen, 1968). We estimate Jensen's Alpha as the intercept from a regression in which the portfolio risk premium is the dependent variable and the market risk premium is the independent variable as seen in **Equation 3**.

Equation 3: $$R_{pt} - R_f = \alpha + \beta(R_{mkt} - R_f)$$

Our final measure of risk-adjusted performance is the alpha from a Fama-French 3-Factor Model. Like the CAPM, the Fama-French Model considers a market risk factor (MKT), but it also adds a size factor (SMB) and a value factore based on the book to market ratio (HML), as well (Fama and French, 1993). We estimate the Fama-French alpha as the intercept from a regression in which the portfolio risk premium is the dependent variable and the market risk premium (MKT), size factor (SMB), and value factor (HML) are the independent variables as seen in **Equation 4**. The Fama-French factors were obtained from the website of Ken French (French, 2018).

Equation 4: $$R_{pt} - R_f = \alpha + \beta_1(MKT) + \beta_2(SMB) + \beta_3(HML)$$

IV. Results and Analysis

Raw Returns

We begin our analysis by examining the raw returns to the Sector Dog and the Dogs of the Dow Portfolios and the S&P 500. We examine both average monthly returns each year and the annual buy and hold returns to each portfolio. We compute the differences in returns between the Sector Dogs and the Dogs of the Dow Portfolios and the S&P 500 and use t-tests to determine if the differences are statistically significant.

We compare the raw returns of the Sector Dogs Portfolios to the raw returns of the S&P 500 on an average monthly return basis by year. We found that they had higher raw returns than the S&P 500 12 out of 18 years with an average of a 0.5941% higher return overall, and this observation had a 5% statistical significance. On the buy and hold raw returns, the Sector Dogs Portfolios again had higher returns than the S&P 500 in 12 out of 18 years. They, on average, had a 7.66% higher return, and this observation had a 5% statistical significance. The large return difference is also economically significant. Hence, the Sector Dogs Portfolios had higher raw returns than the S&P 500 that are both statistically and economically significant. The results of the raw returns between the Sector Dogs Portfolios and the S&P 500 are found in **Tables 2A** and **3A**.

We also compare the raw returns of the Dogs of the Dow Portfolios to the raw returns of the S&P 500 on an average monthly return basis per year, the Dogs of the Dow Portfolios had higher returns than the S&P 500 on 12 out of 18 years of observation. When this was averaged, the Dogs of the Dow Portfolios beat the S&P 500 by 0.3829% with this being statistically significant to the 5% level. The Dogs of the Dow Portfolios also had higher raw returns than the S&P 500 when the portfolios were bought and held over a year long period. In 12 out of 18 years, the Dogs of the Dow Portfolios had higher raw returns the S&P 500 with an average of a 4.29% higher return, and this was statistically significant to the 5% level. This means that on

both an average monthly basis and a year-long buy and hold return basis, the Dogs of the Dow Portfolios had statistically higher raw returns than the S&P 500. The results of the raw returns between the Dogs of the Dow Portfolios and the S&P 500 are found in **Tables 2B** and **3B**.

Finally, we compare the raw returns of the Sector Dogs Portfolios to the Dogs of the Dow Portfolios on an average monthly return basis per year. The Sector Dogs Portfolios tended to have a higher returns on 10 out of 18 years with an average of a 0.2112% higher return. However, this was not statistically significant. Similarly, the Sector Dogs Portfolios also tended to have higher returns than the Dogs of the Dow Portfolios on buy and hold returns. On 10 out of 18 years, the Sector Dogs Portfolios had higher raw returns, with an average overall of a 3.37% higher return. Again, however, this was not statistically significant. Therefore, though the Sector Dogs Portfolios tended to have higher average returns on both an average monthly basis and a year-long buy and hold return basis, this observation had too much variation to be deemed statistically significant. The results of the raw returns between the Sector Dogs Portfolios and the Dogs of the Dow Portfolios are found in **Tables 2C** and **3C**. **Chart 1** shows the growth in values of $1,000 invested in each strategy and the S&P 500.

Risk-Adjusted Measures

In order to adjust for risk in our study, we utilize the Sharpe Ratio, Treynor Ratio, Jensen's Alpha, and the Fama French 3-Factor Model to the Sector Dogs Portfolios, Dogs of the Dow Portfolios, and S&P 500.

When the Sector Dogs Portfolios are compared to the S&P 500 using the Sharpe Ratio, they outperform the S&P 500 on 12 out of 18 years with an average of a 0.1182 higher Sharpe Ratios. This means that the Sector Dogs Portfolios had higher returns than the S&P 500 given the amount of total risk. However, due to variation in the observations, this finding was not

statistically significance. When the Treynor Ratio was applied, the Sector Dogs Portfolios again had a higher Treynor Ratio than the S&P 500, with 13 out of 18 years having higher Treynor Ratios. They, on average, had a 0.8907 higher Treynor Ratio, and this observation had a 5% statistical significance. That means that the Sector Dogs Portfolios had a statistically higher returns than the S&P 500 given the amount of systematic risk of the portfolios. The results of the Sharpe and Treynor ratios between the Sector Dogs Portfolios and the S&P 500 are found in **Tables 4A** and **5A**.

The Dogs of the Dow Portfolios are also compared to the S&P 500 using the Sharpe Ratio. We found that the Dogs of the Dow Portfolios had higher returns than the S&P 500 on 10 out of 18 years of observations. When this was averaged, the Dogs of the Dow Portfolios had an average higher Sharpe Ratio of 0.0518. This means that the Dogs of the Dow Portfolios had higher returns given the amount of total risk than the S&P 500. However, this was not statistically significant because of the amount of variation in the observations. The Dogs of the Dow Portfolios also had higher returns than the S&P 500 when the portfolios were adjusted for risk with the Treynor Ratio. In 15 out of 18 years, the Dogs of the Dow Portfolios had higher Treynor Ratios than the S&P 500 with an average of a 0.9281 higher Treynor Ratio, and this was statistically significant to the 10% level. This means that the Dogs of the Dow Portfolios had a statistically higher return given systematic risk than the S&P 500. The results of the Sharpe and Treynor Ratios between the Dogs of the Dow Portfolios and the S&P 500 are found in **Tables 4B** and **5B**.

We also compared the Sector Dogs Portfolios to the Dogs of the Dow Portfolios using the Sharpe Ratio. The Sector Dogs Portfolios tended to have a higher returns in 10 out of 18 years with an average of a 0.0664 higher Sharpe Ratio. This shows that the Sector Dogs Portfolios had

higher returns than the Dogs of the Dow Portfolios given the amount of total risk of the portfolios. However, the amount of variation in the observations made the finding not statistically significant. The Sector Dogs Portfolios tended to have lower returns than the Dogs of the Dow Portfolios when adjusted for risk with the Treynor Ratio. In 13 out of 18 years, the Dogs of the Dow Portfolios had higher Treynor Ratios than the Sector Dogs Portfolio, with an average overall of a 0.0374 higher Treynor Ratio. This means that the Dogs of the Dow Portfolios had higher returns than the Sector Dogs Portfolios given the amount of systematic risk of the portfolios. Again, however, variations in the observations made this finding not statistically significant. The results of the Sharpe and Treynor Ratios between the Sector Dogs Portfolios and the Dogs of the Dow Portfolios are found in **Tables 4C** and **5C**.

When we adjusted for risk with Jensen's Alpha, the Sector Dogs Portfolios were positive in 14 out of 18 years with 3 of those 14 years being 5% statistically significant. Jensen's Alpha was also calculated over the entire period for the Sector Dogs Portfolios. This calculation was positive and found to be statistically significant to the 1% level. Overall, that means that the Sector Dogs Portfolios statistically earned more returns than they should have given the amount of risk that the portfolios had. When we used Jensen's Alpha to adjust for risk for the Dogs of the Dow, they were found to be positive in 11 out of 18 years with 1 of those years being significant at the 5% level. For the entire period, the Dogs of the Dow Portfolios had a positive Jensen's Alpha. However, it was not significant. This means that though the Dogs of the Dow Portfolios had a positive Jensen's Alpha, meaning that they earned more return than the risk of the portfolios, the variation in observations made the finding unreliable. The results of the Jensen's Alpha calculations for the Sector Dogs Portfolios and the Dogs of the Dow Portfolios are found in **Tables 6A** and **6B**.

After adjusting for risk using the Fama French 3-Factor Model, we found that the Sector Dogs Portfolios had a positive Fama French alpha in 10 out of 18 years of observations with 2 of them being significant at conventional levels. For the entire period, the Sector Dogs Portfolios had a positive Fama French alpha, but this observation was found to not be statistically significant. This means that overall, the Sector Dogs Portfolios had more return than they should have given their risk, even after adjusting for size and book to market equity value, but the variations in observations made this finding unreliable. We also found that the Dogs of the Dow Portfolios had a positive Fama French alpha in 10 out of 18 years of observations. However, none of these were statistically significant at conventional levels. For the entire period, the Dogs of the Dow Portfolios had a positive Fama French alpha, but it was not statistically significant. Again, this means that overall, the Dogs of the Dow Portfolios had more return than they should have given their risk, even after adjusting for size and book to market equity value, but the variations in observations made this finding unreliable. The results of the Fama French 3-Factor Model calculations for the Sector Dogs Portfolios and the Dogs of the Dow Portfolios are found in **Tables 7A** and **7B**.

V. Discussion and Conclusions

We expected both the Sector Dogs Portfolios and the Dogs of the Dow Portfolios to outperform the S&P 500 because they consist of value stocks and thus should have higher long term returns. We also expected the Sector Dogs Portfolios to have higher returns than the Dogs of the Dow Portfolios and the S&P 500 due to having a larger pool of companies to draw from. We believe that these hypotheses upheld in the raw return data. The Sector Dogs Portfolios and the Dogs of the Dow Portfolios did have higher raw returns than the S&P 500, and these were

statistically significant for the Sector Dogs Portfolios. The Sector Dogs also had higher raw returns than the Dogs of the Dow Portfolios, though these were not statistically significant.

However, the performance of the Sector Dogs Portfolios showed mixed results when it came to adjustments for risk. The Sector Dogs Portfolios had a higher Sharpe Ratio than both the S&P 500 and the Dogs of the Dow Portfolios, but neither was found to be statistically significant. This lack of statistical significance means that though the Sector Dogs Portfolios tended to have higher returns given total risk, the variations of the observations could have made the outcome just a coincidence. On the contrary, the Sector Dogs Portfolios had a lower Treynor Ratio than the Dogs of the Dow Portfolios. This finding was also not statistically significant, which means that this finding could also be unreliable. However, the Sector Dogs Portfolios did have a higher Treynor Ratio than the S&P 500, and this was found to be statistically significant. The Sector Dogs Portfolios also had a positive Jensen's Alpha that was statistically significant, while the Dogs of the Dow Portfolios, though also having a positive Jensen's Alpha, did not show statistical significance. Both the Sector Dogs and the Dogs of the Dow Portfolios had positive Fama French alphas, though neither was statistically significant.

The increased pool of constituents and the increased diversification of the Sector Dogs Portfolios did contribute to their higher risk-adjusted performance. They might improve the risk-adjusted performance of a larger portfolio, as shown by the statistically significant Treynor Ratio compared to the S&P 500. According to the Jensen's Alpha findings, the Sector Dogs Portfolios earn more return than they should have given their level of risk, and this was found to be statistically significant. Finally, the Sector Dogs Portfolios even showed promise in having higher returns given risk, value, and size adjustments, as shown in the Fama French 3-Factor

Model findings. Though these findings were not statistically significant, they were still positive, which could be a positive indicator of higher returns.

One limitation of our study is that we did not explicitly consider the impact of taxes and transaction costs. However, given that tax rates vary among investors and that these rates change over time, estimating tax effects is somewhat impractical. Rather, following Schadler and Cotten (2008) we assume investments could be made through IRAs or other tax-deferred or tax-exempt accounts. Regarding transactions costs, we note that transactions costs could differ greatly among the strategies analyzed. Assuming 100% portfolio turnover (worst case) the Sector Dogs strategy would involve approximately 100 transactions per year and the Dogs of the Dow strategy would involve 20 transactions, while investing in an S&P 500 Index Fund could be done with one transaction and no transactions costs.

However, given the low and decreasing costs of digital trading, even a strategy involving 100 trades could be implemented relatively cheaply. Many online brokers, including Fidelity and Charles Schwab now offer flat commissions under $5 per trade (Reinkensmeyer, 2018). Again, assuming the worst case (and unlikely) 100% turnover, the Sector Dogs Strategy could be implemented for less than $500, or 0.5% for a $100,000 portfolio. Transactions costs would be even less for the traditional Dogs of the Dow. Considering transactions costs of 0.5% for the Sector Dogs and 0.1% for the Dogs of the Dow, the raw returns of the Sector Dogs strategy, 12.625%, and the Dogs of the Dow strategy, 9.258%, are far higher than the adjustments for the transactions costs respectively. Therefore, taxes and transactions costs would have little impact on our results, and it appears that the Sector Dogs Investment strategy could be a very successful strategy, offering higher returns that are both statistically and economically significant. Admittedly, transactions costs would be higher (on a percentage basis) for small investors or

investors implementing this strategy as only a portion of their overall portfolio. In this instance, implementing this strategy through the ALPS Sector Dividend Dogs ETF would be a low cost way to take advantage of this strategy, as its expense ratio in 2018 was 0.40% ("ALPS Fund", 2018).

Overall, the Sector Dogs Portfolios upheld our hypotheses, especially for raw returns. Though the results of the risk-adjusted returns were mixed, the Sector Dogs Portfolios had statistically significant returns that outperformed the S&P 500 for the Treynor Ratio and statistically significant returns that exceed the expected return given the amount of risk for Jensen's Alpha. For now, the data that we observe shows that it could be even more profitable than the Dogs of the Dow and it significantly and economically outperforms the S&P 500.

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Appendix A: Ratio Definitions

Appendix A includes all formulas used to calculate the financial ratios found in Tables 1A, 1B, and 1C.

Leverage:

$$Debt\ to\ Assets = \frac{Liabilities}{Assets}$$

$$LT\ Debt\ to\ Assets = \frac{LT\ Debt}{Assets}$$

$$Debt\ to\ Capital = \frac{LT\ Debt}{LT\ Debt + Equity}$$

$$Debt\ to\ Equity = \frac{Liabilities}{Equity}$$

$$Interest\ Coverage = \frac{EBIT}{Interest}$$

Profitability

$$ROS = \frac{Net\ Income}{Revenue}$$

$$ROA = \frac{Earnings}{Assets}$$

$$ROE = \frac{Earnings}{Equity}$$

$$ROIC = \frac{Earnings}{LT\ Debt + Equity}$$

Value

$$PE = \frac{Price}{Earnings\ Per\ Share}$$

$$Market\ to\ Book\ Ratio = \frac{Market\ Value\ of\ Equity}{Book\ Value\ of\ Equity}$$

$$Dividend\ Yield = \frac{Annual\ Dividend}{Year\ End\ Price}$$

Appendix B: Tables

Appendix B includes all of the tables the document raw return data and risk-adjusted measures.

Table 1A: Sector Dogs v. S&P 500 - Descriptive Statistics

This table shows the differences between the Sector Dogs Portfolio Companies and the S&P 500 companies, as well as the statistical significance of the differences. The P-Values were retrieved from a T-Test testing the difference between the two samples.

	Mean: Sector Dogs	Mean: S&P 500	Difference	P-Value
Size				
Market Cap	35,938.30	24,477.50	11,460.80	<.0001
Total Assets	61,430.40	46,399.70	15,030.70	0.0291
Leverage				
Debt/Assets	0.6667	0.6125	0.0542	<.0001
LTD/Assets	0.2700	0.2100	0.0600	<.0001
Debt to Capital	0.4594	0.3698	0.0896	<.0001
Debt to Equity	4.2186	3.4670	0.7516	0.0007
Interest Coverage	10.6421	16.4908	(5.8487)	<.0001
Profitability				
ROS	8.76%	8.13%	0.63%	0.3092
ROA	4.74%	5.46%	-0.72%	0.002
ROE	12.81%	14.42%	-1.61%	0.0085
ROIC	9.32%	9.61%	-0.29%	0.6173
Value				
Dividend Yield	0.0483	0.0177	0.0306	<.0001
PE	24.5603	26.2395	(1.6792)	0.0824
Market/Book	4.0990	4.2056	(0.1066)	0.7578

Table 1B: Dogs of the Dow v. S&P 500 - Descriptive Statistics

This table shows the differences between the Dogs of the Dow Portfolio Companies and the S&P 500 companies, as well as the statistical significance of the differences. The P-Values were retrieved from a T-Test testing the difference between the two samples.

	Mean: Dogs of Dow	Mean: S&P 500	Difference	P-Value
Size				
Market Cap	111,697.00	24,477.50	87,219.50	<.0001
Total Assets	243,482.00	46,399.70	197,082.30	<.0001
Leverage				
Debt/Assets	0.651	0.613	0.0387	0.0026
LTD/Assets	0.208	0.210	(0.0020)	0.7912
Debt to Capital	0.419	0.370	0.0491	0.0018
Debt to Equity	4.326	3.467	0.8589	0.0593
Interest Coverage	13.021	16.491	(3.4702)	0.0244
Profitability				
ROS	11.37%	8.13%	3.24%	0.0001
ROA	5.29%	5.46%	-0.17%	0.6468
ROE	17.41%	14.42%	2.99%	0.0225
ROIC	9.84%	9.61%	0.23%	0.6992
Value				
Dividend Yield	0.041	0.018	0.0234	<.0001
PE	21.842	26.240	(4.3980)	0.0001
Market/Book	3.159	4.206	(1.0469)	<.0001

Table 1C: SectorDogs v. Dogs of the Dow - Descriptive Statistics

This table shows the differences between the Sector Dogs Portfolio Companies and the Dogs of the Dow Portfolio Companies, as well as the statistical significance of the differences. The P-Values were retrieved from a T-Test testing the difference between the two samples.

	Mean: Sector Dogs	Mean: Dogs of Dow	Difference	P-Value
Size				
Market Cap	35,938.30	111,697.00	(75,758.70)	<.0001
Total Assets	61,430.40	243,482.00	(182,051.60)	<.0001
Leverage				
Debt/Assets	0.6667	0.6512	0.0155	0.2374
LTD/Assets	0.2700	0.2080	0.0620	<.0001
Debt to Capital	0.4594	0.4189	0.0405	0.0256
Debt to Equity	4.2186	4.3259	(0.1073)	0.8529
Interest Coverage	10.6421	13.0206	(2.3785)	0.2201
Profitability				
ROS	8.76%	11.37%	-2.61%	0.0092
ROA	4.74%	5.29%	-0.55%	0.2255
ROE	12.81%	17.41%	-4.60%	0.0016
ROIC	9.32%	9.84%	-0.52%	0.5451
Value				
Dividend Yield	0.0483	0.0411	0.0072	0.0002
PE	24.5603	21.8415	2.7188	0.12
Market/Book	4.0990	3.1587	0.9403	0.0068

Table 2A - Sector Dogs v. S&P 500: Average Monthly Returns by Year

This table shows the difference in average monthly returns between the Sector Dogs Portfolio and the S&P 500 Portfolio by year, as well as an average difference between the two and the statistical significance.

Year	Sector Dogs Portfolio	S&P 500 Portfolio	Difference
2000	-0.020%	-0.776%	0.757%
2001	1.482%	-1.006%	2.488%
2002	-0.918%	-2.029%	1.111%
2003	2.807%	2.018%	0.789%
2004	1.347%	0.740%	0.607%
2005	0.607%	0.270%	0.337%
2006	1.978%	1.082%	0.896%
2007	-0.242%	0.325%	-0.567%
2008	-3.989%	-3.788%	-0.201%
2009	4.992%	1.965%	3.027%
2010	1.748%	1.150%	0.598%
2011	0.943%	0.096%	0.848%
2012	0.999%	1.097%	-0.098%
2013	2.040%	2.212%	-0.172%
2014	1.234%	0.928%	0.306%
2015	-0.233%	0.009%	-0.242%
2016	1.803%	0.801%	1.002%
2017	0.706%	1.496%	-0.790%
Average Difference:	0.960%	0.366%	0.594%
P-Value:			0.0187

Table 2B - Dogs of the Dow v. S&P 500: Average Monthly Returns by Year

This table shows the difference in average monthly returns between the Dogs of the Dow Portfolio and the S&P 500 Portfolio by year, as well as an average difference between the two and the statistical significance.

Year	Dogs of the Dow Portfolio	S&P 500 Portfolio	Difference
2000	0.146%	-0.776%	0.922%
2001	0.056%	-1.006%	1.062%
2002	-0.887%	-2.029%	1.142%
2003	2.722%	2.018%	0.703%
2004	0.525%	0.740%	-0.215%
2005	-0.493%	0.270%	-0.763%
2006	2.368%	1.082%	1.286%
2007	0.183%	0.325%	-0.142%
2008	-4.746%	-3.788%	-0.958%
2009	2.889%	1.965%	0.924%
2010	1.515%	1.150%	0.365%
2011	1.266%	0.096%	1.170%
2012	1.201%	1.097%	0.104%
2013	1.998%	2.212%	-0.214%
2014	1.097%	0.928%	0.169%
2015	0.604%	0.009%	0.595%
2016	1.675%	0.801%	0.873%
2017	1.364%	1.496%	-0.131%
Average Difference:	0.749%	0.366%	0.383%
P-Value:			0.0294

Table 2C - Sector Dogs v. Dogs of the Dow: Average Monthly Returns by Year

This table shows the difference in average monthly returns between the Sector Dogs Portfolio and the Dogs of the Dow Portfolio by year, as well as an average difference between the two and the statistical significance.

Year	Sector Dogs Portfolio	Dogs of the Dow Portfolio	Difference
2000	-0.020%	0.146%	-0.165%
2001	1.482%	0.056%	1.426%
2002	-0.918%	-0.887%	-0.031%
2003	2.807%	2.722%	0.086%
2004	1.347%	0.525%	0.822%
2005	0.607%	-0.493%	1.100%
2006	1.978%	2.368%	-0.390%
2007	-0.242%	0.183%	-0.425%
2008	-3.989%	-4.746%	0.757%
2009	4.992%	2.889%	2.103%
2010	1.748%	1.515%	0.233%
2011	0.943%	1.266%	-0.323%
2012	0.999%	1.201%	-0.202%
2013	2.040%	1.998%	0.042%
2014	1.234%	1.097%	0.137%
2015	-0.233%	0.604%	-0.837%
2016	1.803%	1.675%	0.128%
2017	0.706%	1.364%	-0.659%
Average Difference:	0.960%	0.749%	0.211%
P-Value:			0.2554

Table 3A - Sector Dogs v. S&P 500: Buy and Hold Returns

This table shows the difference in buy and hold returns between the Sector Dogs Portfolio and the S&P 500 Portfolio by year, as well as an average difference between the two and the statistical significance.

Year	Sector Dogs Portfolio	S&P 500 Portfolio	Difference
2000	-2.289%	-10.139%	7.850%
2001	17.851%	-13.043%	30.894%
2002	-12.432%	-23.366%	10.934%
2003	37.360%	26.380%	10.980%
2004	17.062%	8.993%	8.069%
2005	7.127%	3.001%	4.126%
2006	26.369%	13.620%	12.749%
2007	-3.405%	3.530%	-6.935%
2008	-40.494%	-38.486%	-2.008%
2009	64.980%	23.454%	41.526%
2010	21.498%	12.783%	8.715%
2011	10.997%	-0.003%	11.000%
2012	12.169%	13.406%	-1.237%
2013	26.954%	29.601%	-2.647%
2014	15.485%	11.390%	4.095%
2015	-3.477%	-0.727%	-2.750%
2016	22.887%	9.535%	13.352%
2017	8.602%	19.420%	-10.818%
Average Difference:	12.625%	4.964%	7.660%
P-Value:			0.0204

Table 3B - Dogs of the Dow v. S&P 500: Buy and Hold Returns

This table shows the difference in buy and hold returns between the Dogs of the Dow Portfolio and the S&P 500 Portfolio by year, as well as an average difference between the two and the statistical significance.

Year	Dogs of the Dow Portfolio	S&P 500 Portfolio	Difference
2000	-0.492%	-10.139%	9.647%
2001	-1.516%	-13.043%	11.527%
2002	-13.061%	-23.366%	10.305%
2003	36.130%	26.380%	9.750%
2004	5.855%	8.993%	-3.138%
2005	-6.008%	3.001%	-9.009%
2006	32.180%	13.620%	18.560%
2007	1.418%	3.530%	-2.112%
2008	-45.769%	-38.486%	-7.283%
2009	23.710%	23.454%	0.256%
2010	18.539%	12.783%	5.756%
2011	15.647%	-0.003%	15.650%
2012	15.062%	13.406%	1.656%
2013	26.320%	29.601%	-3.281%
2014	13.760%	11.390%	2.370%
2015	6.053%	-0.727%	6.780%
2016	21.350%	9.535%	11.815%
2017	17.465%	19.420%	-1.955%
Average Difference:	9.258%	4.964%	4.290%
P-Value:			0.0350

Table 3C - Sector Dogs v. Dogs of the Dow: Buy and Hold Returns

This table shows the difference in buy and hold returns between the Sector Dogs Portfolio and the Dogs of the Dow Portfolio by year, as well as an average difference between the two and the statistical significance.

Year	Sector Dogs Portfolio	Dogs of the Dow Portfolio	Difference
2000	-2.289%	-0.492%	-1.797%
2001	17.851%	-1.516%	19.367%
2002	-12.432%	-13.061%	0.629%
2003	37.360%	36.130%	1.230%
2004	17.062%	5.855%	11.207%
2005	7.127%	-6.008%	13.135%
2006	26.369%	32.180%	-5.811%
2007	-3.405%	1.418%	-4.823%
2008	-40.494%	-45.769%	5.275%
2009	64.980%	23.710%	41.270%
2010	21.498%	18.539%	2.959%
2011	10.997%	15.647%	-4.650%
2012	12.169%	15.062%	-2.893%
2013	26.954%	26.320%	0.634%
2014	15.485%	13.760%	1.725%
2015	-3.477%	6.053%	-9.530%
2016	22.887%	21.350%	1.537%
2017	8.602%	17.465%	-8.863%
Average Difference:	12.625%	9.258%	3.370%
P-Value:			0.2529

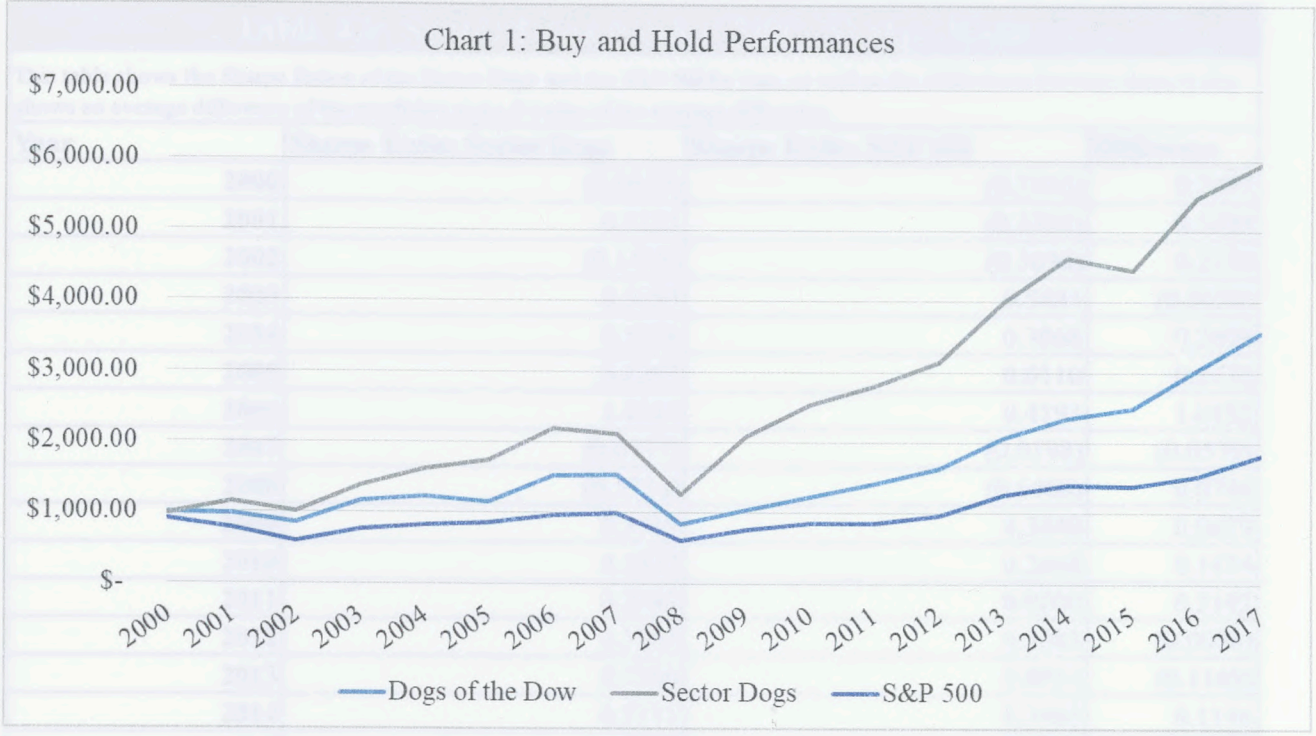
Chart 1: Buy and Hold Performances
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2016
2017
Dogs of the Dow
Sector Dogs
S&P 500

Table 4A: Sector Dogs v. S&P 500 - Sharpe Ratio			
This table shows the Sharpe Ratios of the Sector Dogs and the S&P 500 by year, as well as the differences between them. It also shows an average difference of the portfolios and a P-value of the average difference.			
Year	**Sharpe Ratio: Sector Dogs**	**Sharpe Ratio: S&P 500**	**Difference**
2000	(0.0039)	(0.2536)	0.2497
2001	0.3125	(0.2302)	0.5428
2002	(0.1468)	(0.3639)	0.2170
2003	0.5253	0.5883	(0.0630)
2004	0.5676	0.3068	0.2609
2005	0.2282	0.0110	0.2172
2006	1.4346	0.4193	1.0152
2007	(0.0777)	(0.0198)	(0.0579)
2008	(0.5724)	(0.6468)	0.0744
2009	0.3919	0.3040	0.0879
2010	0.3522	0.2048	0.1474
2011	0.2392	0.0200	0.2192
2012	0.3505	0.3583	(0.0078)
2013	0.7786	0.8954	(0.1168)
2014	0.5111	0.3965	0.1146
2015	(0.0624)	0.0022	(0.0646)
2016	0.4546	0.2658	0.1887
2017	0.3775	1.2746	(0.8971)
Average Difference:	0.3145	0.1963	0.1182
P-Value:			0.1868

Table 4B: Dogs of the Dow v. S&P 500 - Sharpe Ratio			
This table shows the Sharpe Ratios of the Dogs of the Dow and the S&P 500 by year, as well as the differences between them. It also shows an average difference of the portfolios and a P-value of the average difference.			
Year	**Sharpe Ratio: Dogs of the Dow**	**Sharpe Ratio: S&P 500**	**Difference**
2000	(0.0517)	(0.2536)	0.2019
2001	(0.0409)	(0.2302)	0.1894
2002	(0.1338)	(0.3639)	0.2301
2003	0.5129	0.5883	(0.0753)
2004	0.1291	0.3068	(0.1777)
2005	(0.3354)	0.0110	(0.3464)
2006	1.0387	0.4193	0.6193
2007	(0.0526)	(0.0198)	(0.0328)
2008	(0.7204)	(0.6468)	(0.0736)
2009	0.1901	0.3040	(0.1139)
2010	0.3441	0.2048	0.1393
2011	0.3914	0.0200	0.3715
2012	0.5048	0.3583	0.1465
2013	0.7529	0.8954	(0.1425)
2014	0.5715	0.3965	0.1751
2015	0.1192	0.0022	0.1170
2016	0.5050	0.2658	0.2391
2017	0.7397	1.2746	(0.5349)
Average Difference:	0.2480	0.1963	0.0518
P-Value:			0.4251

Table 4C: Sector Dogs v. Dogs of the Dow - Sharpe Ratio			
This table shows the Sharpe Ratios of the Dogs of the Dow and the Sector Dogs by year, as well as the differences between them. It also shows an average difference of the portfolios and a P-value of the average difference.			
Year	**Sharpe Ratio: Sector Dogs**	**Sharpe Ratio: Dogs of the Dow**	**Difference**
2000	(0.0039)	(0.0517)	0.0478
2001	0.3125	(0.0409)	0.3534
2002	(0.1468)	(0.1338)	(0.0131)
2003	0.5253	0.5129	0.0123
2004	0.5676	0.1291	0.4386
2005	0.2282	(0.3354)	0.5635
2006	1.4346	1.0387	0.3959
2007	(0.0777)	(0.0526)	(0.0251)
2008	(0.5724)	(0.7204)	0.1480
2009	0.3919	0.1901	0.2018
2010	0.3522	0.3441	0.0081
2011	0.2392	0.3914	(0.1523)
2012	0.3505	0.5048	(0.1543)
2013	0.7786	0.7529	0.0257
2014	0.5111	0.5715	(0.0604)
2015	(0.0624)	0.1192	(0.1816)
2016	0.4546	0.5050	(0.0504)
2017	0.3775	0.7397	(0.3622)
Average Difference:	0.3145	0.2480	0.0664
P-Value:			0.2603

Table 5A: Sector Dogs v. S&P 500 - Treynor Ratio

This table shows the Treynor Ratios of the Sector Dogs and the S&P 500 by year, as well as the differences between them. It also shows the average difference of the portfolios and a P-Value of the average difference.

Year	Treynor Ratio: Sector Dogs	Treynor Ratio: S&P 500	Difference
2000	(0.0258)	(0.0125)	(0.0132)
2001	2.1919	(0.0132)	2.2051
2002	(0.9937)	(0.0216)	(0.9720)
2003	1.8438	0.0193	1.8244
2004	1.3386	0.0064	1.3321
2005	0.5552	0.0002	0.5549
2006	2.6751	0.0069	2.6682
2007	(0.2399)	(0.0006)	(0.2393)
2008	(3.7713)	(0.0392)	(3.7321)
2009	2.6575	0.0196	2.6379
2010	1.9910	0.0114	1.9795
2011	1.1715	0.0009	1.1706
2012	1.2332	0.0109	1.2223
2013	2.3789	0.0221	2.3568
2014	1.3437	0.0093	1.3344
2015	(0.2785)	0.0001	(0.2786)
2016	1.4524	0.0078	1.4446
2017	0.5511	0.0143	0.5368
Average Difference:	0.8930	0.0023	0.8907
P-Value:			0.0272

Table 5B: Dogs of the Dow v. S&P 500 - Treynor Ratio

This table shows the Treynor Ratios of the Dogs of the Dow and the S&P 500 by year, as well as the differences between them. It also shows the average difference of the portfolios and a P-Value of the average difference.

Year	Treynor Ratio: Dogs of the Dow	Treynor Ratio: S&P 500	Difference
2000	0.1699	(0.0125)	0.1824
2001	0.0603	(0.0132)	0.0735
2002	(0.7577)	(0.0216)	(0.7361)
2003	1.8559	0.0193	1.8366
2004	0.4085	0.0064	0.4021
2005	(0.7133)	0.0002	(0.7136)
2006	5.7258	0.0069	5.7189
2007	0.1423	(0.0006)	0.1428
2008	(5.7773)	(0.0392)	(5.7381)
2009	1.2565	0.0196	1.2369
2010	2.0688	0.0114	2.0574
2011	2.2822	0.0009	2.2813
2012	2.1114	0.0109	2.1005
2013	2.6377	0.0221	2.6155
2014	1.8542	0.0093	1.8449
2015	0.4955	0.0001	0.4954
2016	1.6861	0.0078	1.6782
2017	1.2417	0.0143	1.2274
Average Difference:	0.9305	0.0023	0.9281
P-Value:			0.0962

Table 5C: Sector Dogs v. Dogs of the Dow - Treynor Ratio

This table shows the Treynor Ratios of the Sector Dogs and the Dogs of the Dow by year, as well as the differences between them. It also shows the average difference of the portfolios and a P-Value of the average difference.

Year	Treynor Ratio: Sector Dogs	Treynor Ratio: Dogs of the Dow	Difference
2000	(0.0258)	0.1699	(0.1957)
2001	2.1919	0.0603	2.1316
2002	(0.9937)	(0.7577)	(0.2359)
2003	1.8438	1.8559	(0.0121)
2004	1.3386	0.4085	0.9300
2005	0.5552	(0.7133)	1.2685
2006	2.6751	5.7258	(3.0507)
2007	(0.2399)	0.1423	(0.3821)
2008	(3.7713)	(5.7773)	2.0061
2009	2.6575	1.2565	1.4010
2010	1.9910	2.0688	(0.0779)
2011	1.1715	2.2822	(1.1107)
2012	1.2332	2.1114	(0.8782)
2013	2.3789	2.6377	(0.2588)
2014	1.3437	1.8542	(0.5105)
2015	(0.2785)	0.4955	(0.7740)
2016	1.4524	1.6861	(0.2336)
2017	0.5511	1.2417	(0.6906)
Average Difference:	0.8930	0.9305	(0.0374)
P-Value:			0.8993

Table 6A: Sector Dogs - Jensen's Alpha		
This table shows the Jensen's Alpha of the Sector Dogs portfolio by year, as well as the P-Value of each Jensen's Alpha by year. It also shows an average difference of the portfolio and a P-Value of the average difference.		
Year	**Jensen's Alpha: Sector Dogs**	**P-Value**
2000	0.6875	0.5994
2001	2.0584	0.0341
2002	0.9495	0.3503
2003	(0.2206)	0.7475
2004	0.6030	0.1094
2005	0.3352	0.3028
2006	1.0765	0.0006
2007	(0.5658)	0.1854
2008	0.0265	0.9792
2009	1.3072	0.3278
2010	0.7374	0.0163
2011	0.8655	0.0569
2012	0.1095	0.8169
2013	0.1430	0.8274
2014	0.3817	0.3143
2015	(0.2406)	0.6584
2016	0.8125	0.1216
2017	(1.1897)	0.0758
Averages:	0.4376	0.3625
Average (Entire Period):		0.5815
P-Value (Entire Period):		0.0015

Table 6B: Dogs of the Dow - Jensen's Alpha		
This table shows the Jensen's Alpha of the Dogs of the Dow portfolio by year, as well as the P-Value of each Jensen's Alpha by year. It also shows an average difference of the portfolio and a P-Value of the average difference.		
Year	**Jensen's Alpha: Dogs of the Dow**	**P-Value**
2000	0.7095	0.6539
2001	0.8990	0.4613
2002	1.5163	0.1647
2003	(0.1978)	0.7629
2004	(0.3969)	0.5314
2005	(0.7550)	0.1405
2006	1.6912	0.0167
2007	(0.1279)	0.7520
2008	(1.6571)	0.3427
2009	(1.6195)	0.1480
2010	0.6707	0.2018
2011	1.2113	0.0692
2012	0.5751	0.2975
2013	0.3224	0.6881
2014	0.5479	0.2369
2015	0.5931	0.2461
2016	0.8786	0.0883
2017	(0.2718)	0.6717
Averages:	0.2549	0.3597
Average (Entire Period):		0.3623
P-Value (Entire Period):		0.1056

Table 7A: Sector Dogs - Fama French 3-Factor Model		
This table shows the Fama French alphas of the Sector Dogs portfolio by year, as well as the P-Value of each Fama French alpha by year. It also shows an average difference of the portfolio and a P-Value of the average difference.		
Year	**Fama French: Sector Dogs**	**P-Value**
2000	(0.1391)	0.9164
2001	0.8475	0.2437
2002	0.5197	0.4750
2003	(0.7435)	0.3928
2004	0.1700	0.6145
2005	(0.5934)	0.1430
2006	0.9832	0.0229
2007	(0.1394)	0.7767
2008	(1.0394)	0.1760
2009	1.3612	0.4138
2010	0.7015	0.0487
2011	0.8747	0.1423
2012	(0.4544)	0.3095
2013	(0.2108)	0.7673
2014	0.3758	0.3610
2015	0.0954	0.8433
2016	0.8418	0.1813
2017	(1.2017)	0.0370
Averages:	0.1249	0.3814
Average (Entire Period):		0.2294
P-Value (Entire Period):		0.1367

Table 7B: Dogs of the Dow - Fama French 3-Factor Model		
This table shows the Fama French alphas of the Dogs of the Dow portfolio by year, as well as the P-Value of each Frama French alpha by year. It also shows an average difference of the portfolio and a P-Value of the average difference.		
Year	**Fama French: Dogs of the Dow**	**P-Value**
2000	(1.0126)	0.4961
2001	(0.1087)	0.9001
2002	1.1466	0.2597
2003	(0.5294)	0.5537
2004	(1.0404)	0.0942
2005	(0.9368)	0.2338
2006	0.9130	0.3230
2007	(0.3711)	0.5386
2008	(1.1470)	0.2392
2009	(1.2659)	0.2937
2010	0.9992	0.0641
2011	1.3790	0.1221
2012	0.6577	0.3673
2013	0.1114	0.8732
2014	0.2212	0.5279
2015	0.8126	0.1409
2016	1.0447	0.0805
2017	0.4421	0.4878
Averages:	0.0731	0.3664
Average (Entire Period):		0.0406
P-Value (Entire Period):		0.8341

The Dogs of the Dow Applied to the S&P 500

By: Autumn Wilson

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